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Commissioner for Patents  
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## **DISCUSSION DRAFT AMENDMENT**

### **Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application. These amendments introduce no new matter and support for the amendment is replete throughout the specification and claims as originally filed. These amendments are made without prejudice and are not to be construed as abandonment of the previously claimed subject matter, or agreement with any objection or rejection of record.

### **Listing of Claims:**

#### **1-9 CANCELLED**

**10. (CURRENTLY AMENDED):** A method of repairing a damaged nerve in a living organism comprising:

- selecting one or more axons in said damaged nerve;
- harvesting a donor axon segment;
- positioning said donor axon segment at a severed location of a selected axon by applying a dielectrophoresis signal in proximity of one or more of said donor axon or said selected axon; and
- inducing fusion of said donor axon segment by applying an electric signal in proximity of one or more of said donor axon or said selected axon..

**11. (ORIGINAL):** The method of claim **10** further comprising:

cutting one or more ends of said donor axon and/or said selected axon.

**12. (ORIGINAL):** The method of claim **10** further comprising:

wherein said positioning comprises:

applying a dielectrophoresis signal in proximity of one or more of said donor axon or said selected axon.

**13. (ORIGINAL):** The method of claim **10** further comprising:

wherein said inducing comprises:

applying a electric signal in proximity of one or more of said donor axon or said selected axon.

**14. (ORIGINAL):** The method of claim **10** further comprising:

digesting one or more nerve portions to allow manipulation of individual axons.

**15. (ORIGINAL):** The method of claim **10** further comprising:

using a MEMS axon surgical platform enabling precise manipulation of axons of less than one and up to a few microns in diameter.

**16. (ORIGINAL):** The method of claim **10** wherein said living animal comprises a human.

**17. (ORIGINAL):** The method of claim **10** wherein said living animal comprises a mammal.

**18. (ORIGINAL):** The method of claim **15** further wherein:

said MEMS axon surgical platform enables manipulation of axons directed by a human surgeon.

**19. (CURRENTLY AMENDED):** A method of repairing a damaged nerve in a living organism comprising:

selecting one or more severed axons in said damaged nerve;

positioning one or more of said selected severed axons in close proximity to one or more corresponding severed axons on another side of said damaged nerve by applying a

dielectrophoresis signal in proximity of one or more of said donor axon or said selected axon; and  
inducing fusion of axons placed in proximity by applying an electric signal in proximity of one or more of said axons.

**20-68 CANCELLED**

**69. (NEW):** The method of claim **19** further wherein:

said selecting, positioning, and inducing are performed without determining whether a corresponding severed axons is matched to axon segments to which they were attached before becoming severed.

**70. (NEW):** The method of claim **19** further comprising:

using a nanoknife to cut said one or more severed axons prior to said inducing.

**71. (NEW):** The method of claim **19** further comprising:

placing a three-dimensional microstructure over an area containing said axon;  
said three-dimensional microstructure comprises:  
one or more nanoknives used for cutting axons;  
one or more actuators for moving said nanoknives; and  
one or more effector electrodes for moving axons.  
said three-dimensional microstructure is smaller than approximately one cubic millimeter.

**72. (NEW):** The method of claim **71** further wherein:

said three-dimensional microstructure is smaller than approximately 100 cubic millimeters.

**73. (NEW):** The method of claim **71** further comprising:

placing said three-dimensional microstructure in a surgical frame, said surgical frame comprising one or more gaskets for holding one or more nerves to be repaired;  
said three-dimensional microstructure and said surgical frame comprising one or more microfluidic channels for delivering reagents; and

said three-dimensional microstructure comprising one or more waveguides to enable optical monitoring, visualization, and /or use of light sources.

**74. (NEW):** The method of claim **71** further comprising:

moving an axon segment using a pin/probe and plate electrode pair operably connected with said microstructure such that a region of strongest field is towards the pin electrode thereby stretching an axon towards said pin/probe electrode.

**75. (NEW):** The method of claim **19** further comprising:

moving an axon segment by precisely positioning arrangements of micro-electrodes near to said axon segment; and  
applying electrical signals precisely to particular electrodes to effect precise movements and/or manipulations.

**76-78. CANCEL**